

# SENCO FASTENING SYSTEMS

DuraSpin Screw Fastening System  
Time & Motion Study

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## R.S. MEANS CONSULTING SERVICES

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*Drywall installers participating in the Time & Motion Study commented on unique DuraSpin features including...*

- Auto-feed mechanism eliminates hand feeding of screws
- No extension cord tripping hazard
- Tool easily adapts to left- or right-hand use
- Center-mounted handle reduces forearm fatigue
- Ergonomic design reduces potential physical complaints, such as limited wrist movement
- Less noise and blown dust when operating DuraSpin
- No sharp screw tips when reaching into a pouch or apron
- Fast and ready to go



*"I found Senco's DuraSpin screw fastening system to be an efficient and highly effective tool for the installation of gypsum drywall. The cordless feature and automatic screw feed system makes it possible for a single worker to install 8' drywall sheets without assistance.*

*Furthermore, the ergonomic design allows for repetitive installation of large quantities of screws with little fatigue. DuraSpin has proven itself to be my choice for all future drywall installations."*

**Tom Lambert, Contractor**

# TIME & MOTION STUDY

## *Executive Summary*

### **Background Information**

On June 20 and 21, 2001, a "Time & Motion Study" involving gypsum wallboard (GWB) installation tools was performed at two private residences in Norwood and Marshfield, Massachusetts. Representatives from the R.S. Means Company, Inc. and Senco Fastening Systems were present to witness and record data comparing corded and cordless GWB screw fastening systems. A home improvement contractor, Tom Lambert Construction, was contracted to apply gypsum wallboard to both wood frame and light gauge metal frame construction.

*The purpose of the study was to compare installation time using the DuraSpin cordless screw driver by Senco Fastening Systems with a traditional corded screw gun.*

Neither Tom Lambert Construction nor R.S. Means has any vested interest in the results of the study. Every effort was incorporated to make the study fair and impartial. Each of the tasks involved after the contractor began application is included in the results of the study.

The contractor had been using corded GWB screw guns for more than ten years and is proficient in their use. When introduced to the new DuraSpin on this project, crew members found that only a short learning curve was required. Crew members were exposed to the DuraSpin cordless screw gun at the site only long enough to charge the batteries.

### **Methodology**

The Group Timing Technique (GTT) was used to observe and record tasks performed by the crew. This technique uses a list of tasks, an observer, and a predetermined time interval. The observer makes a tally mark on the specific task on the list of tasks that describes what the crew member is doing at each time interval. At the end of data collection, the amount of time that each crew member spent on each task is determined by counting the number of tally marks for that task and multiplying by the time interval. One-minute intervals were selected for the study because of the interest to examine detailed data regarding specific activities involved in drywall installation.

### **Key Findings of the Study**

- DuraSpin's screw driving cycle time proved to be much faster than the traditional method
- As a result of faster screw driving cycle time, as well as other operator-friendly features, DuraSpin improved overall project productivity by 31%
- 31% productivity improvement means labor savings that far outweigh the incremental cost of collated screws (compared to loose screw cost).

DuraSpin's self-feeding mechanism allowed crew members to use both hands when positioning and fastening gypsum wallboard. Eliminating the need to reach into a tool pouch to obtain a fastener and position it onto the magnetic screw tip allowed one screw cycle to be reduced from 4 to 7 seconds per screw to under 1 second per screw.



# TIME & MOTION STUDY

## Data Analysis

### ***Time & Motion Study compares "old" and "new" installation methods***

R.S. Means was engaged to determine the efficiency of DuraSpin as compared to corded manual feed fastening systems. An engineer went on-site to take measurements of worker movement, installed quantities of product, and calculations of time duration. In Norwood, the contractor had previously built a two-car garage/family room/home office addition to a 60-year-old wood frame home. In Marshfield, the project was to finish a basement into a playroom.

### ***Day 1 Observations – Drywall to Wood Frame Application***

Day 1 included the installation of 5/8" thick GWB on both flat and vaulted ceilings and interior walls. The workers first installed GWB using corded manual feed systems. At several points delays were caused by workers needing to stop and adjust extension cords, reach for a second fastener after dropping one, and realign the drywall sheet after shifting as sheets were held in place using the top of their heads. The observers noted that due to workers reaching and stretching in the normal course of using the manual feed screw gun, many screws did not set completely and had to be redone, backed out, or finished manually.

After completing half of the ceiling area with the corded screw guns, the workers switched to the DuraSpin system. Production time savings and ergonomic differences were immediately apparent.

A 4' x 12' sheet of 5/8" thick GWB weighs about 115 pounds. Once it is lifted into place, the workers want to fasten it as quickly as possible. Using DuraSpin, with its self-feed mechanism, the screw driving cycle rate was faster than one screw per second. The cycle rate for manual feed corded tools was one screw every 4 to 7 seconds. This faster cycle rate allowed workers to completely fasten a 4' x 12' sheet of GWB in less than one minute with DuraSpin. By comparison, fastening the same sheet of GWB with a traditional screwgun takes 4 to 8 minutes.

## ***Cost Savings Analysis***

### ***Installation savings at \$.07 per square foot***

*Using \$25 per hour for 3 crewmembers for 8 hours each = \$600 crew cost per day.*

- If this crew installs 2000 square feet per day, the cost per square foot for labor is equal to \$600 divided by 2000 or \$.30 per square foot.*
- Using DuraSpin the same crew could install 2640 square feet per day.*
- The resulting cost per square foot for labor would be \$600 divided by 2640 or \$.227 per square.*

### ***DuraSpin GWB typical home installation saves \$510.00***

*For a 2500 square foot two story home....*

- Total GWB walls and ceilings equals 8100 square feet*
- Savings using DuraSpin system equals \$591.00*
- Premium cost of collated screws equals about \$10.00 more per 1000 or for the 2500 square foot home - \$81.00*

*Total savings equals \$510.00*

***Cost savings resulting from increased productivity can be demonstrated in the example shown using equal crew size and wages. By using DuraSpin, more GWB can be installed in a given time period resulting in a lower cost per square foot.***

A vaulted ceiling installation yielded similar results. Using DuraSpin, workers were able to fasten the GWB much faster, and with fewer problems. There were several additional advantages to the installation on the vaulted ceiling including the fact that there were no extension cords hanging down from the scaffolding to get tangled, caught, or unplugged.

Small cut-up sheets on the perimeter walls yielded less productivity gain. This was expected as fewer screws are needed on the smaller pieces.

**For the wood frame application in minutes per square foot, DuraSpin performed 30% faster than the manual feed corded screw guns.**

### **Day 2 Observations – Drywall to Metal Stud Application**

On Day 2, installers worked in a basement playroom/laundry area that had been framed using light gauge metal studs. All vertical wall surfaces were covered with 1/2" thick standard GWB. Sections of the surfaces were identified for application with corded and cordless fastening systems. Similar to Day 1, productivity improvements were immediately apparent with DuraSpin.

**For the metal stud application in minutes per square foot, DuraSpin performed 40% faster than the manual feed corded screw fastening system.**

### **Productivity Analysis**

On average, combining results in both wood and steel applications, DuraSpin allowed workers to increase project productivity by 31%. This 31% increase includes all activities involved in GWB installation including layout, cutting, positioning, and fastening GWB. Productivity increased most in long run areas where full sheets or large sections of GWB were installed, and less in those areas that required many cuts or small sheets.

## **Overall, DuraSpin increases productivity by 31%**

Installation - Time in Minutes*	Traditional Screwgun			DuraSpin		
	CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
	Corded	Corded	Corded	Cordless	Cordless	Cordless
Giving/receiving instruction	7	4	0	1	0	0
Material movement	9	15	13	10	10	6
Scaffolding set up	3	2	1	5	1	0
Extension cord set up/break down	6	2	0	0	0	0
Corded set up/break down	2	3	0	0	0	0
Cordless set up/break down	0	0	0	0	2	0
Layout	40	44	5	38	36	3
Cutting	29	26	1	38	30	3
Positioning	23	27	14	25	27	15
Corded Fastening	83	74	0	0	0	0
Cordless fastening	0	0	0	44	38	1
Loading Tool	1	0	0	4	3	0
Cutting box openings	15	3	0	12	0	0
Fix undriven screws by hand	1	1	8	1	1	8
Non-productive time	18	17	27	14	17	24
<b>Total minutes</b>	<b>238</b>	<b>221</b>	<b>69</b>	<b>199</b>	<b>167</b>	<b>60</b>
Total minutes for Crew			528.00			426.00
Total Square Feet Installed			852.00			899.00
Square Feet per Minute			1.61			2.11
<b>Percent Increase in Productivity Using DuraSpin</b>						<b>31%</b>

\*Means Annual Cost Data Books provide benchmark data for facilities remodeling.

Activities such as layout, cutting, etc. defined in this chart represent those specified for GWB installation in Means publications.

# TIME & MOTION STUDY

## Conclusion

DuraSpin's screw driving cycle time proved to be much faster than the traditional corded screw gun. As a result, DuraSpin allowed crew members to work faster, resulting in an overall productivity gain of 31%.

Study findings also illustrate that a 4' x 12' 115 pound sheet of GWB can be fastened completely in place in slightly less than 1 minute with DuraSpin. The same process takes 4 to 8 minutes with a traditional corded screw gun and loose screws.

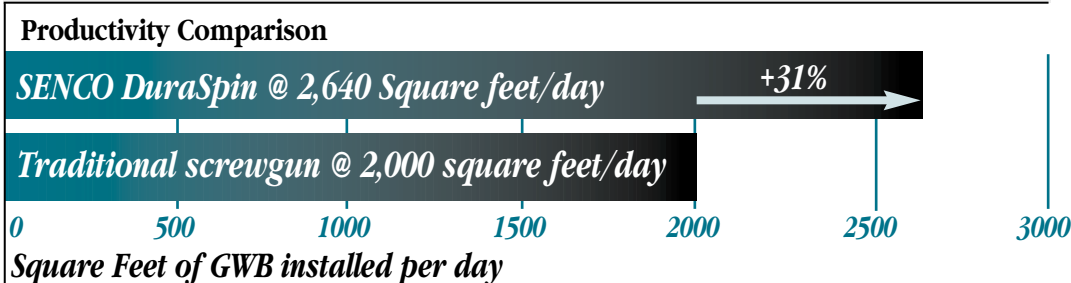
Positioning and fastening GWB with traditional screwguns and loose screws requires the installer to use one hand to reach into a pouch, obtain a screw, and position it onto the magnetic tip of a screwgun held in the other hand. This two-handed operation leaves no hand free to hold the GWB.

DuraSpin's self-feeding mechanism and handy belt hook allowed crew members to use both hands to position GWB, e.g., while one hand holds material in place, the second hand fastens material with the DuraSpin tool. Crew members commented that this new process is like having an extra hand.

In the opinion of R.S. Means, DuraSpin's dramatic increase in productivity as indicated in the Time & Motion Study would benefit professional gypsum wallboard installers, home improvement contractors, and home remodelers.

*As reported in the Time & Motion Study, the "extra hand effect," combined with DuraSpin's much faster screw driving cycle time, resulted in very significant productivity gains.*

***Based on the findings, crew members can be expected to work faster, with a projected 31% gain in productivity***







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